WBL400 Series
Blowdown and Feed Boiler Conductivity Controllers
180447.B-Revised 6/4/2010

Part 1. General

1.1 Scope

A. This section describes the requirements for a blowdown and feed conductivity boiler controller with an automatically temperature compensated electrode.

B. Under this item, the contractor shall furnish and install the conductivity control equipment and accessories as indicated on the plans and as herein specified.

1.2 Submittals

A. The following information shall be included in the submittal for this section:

1. Data sheets and catalog literature for a micro-processor based blowdown and feed boiler conductivity controller and electrode.
2. Interconnection and dimensional drawings.
3. List of spare parts

Part 2. Products

2.1 Blowdown and feed boiler conductivity controller

A. The blowdown and feed boiler conductivity control system shall consist of a control module that provides on/off conductivity control, chemical feed, and a conductivity electrode that provide measurement of the conductivity, as well as a temperature measurement for automatic compensation for errors due to temperature fluctuations.

B. Control Module:

1. Enclosure: Polycarbonate, NEMA 4X, lockable hinged door with clear window.

2. Power: 100-240 VAC, 50/60 Hz, 8A; Fuse: 1.0 ampere, 5 x 20 mm

3. Inputs:
    - Conductivity: 0 to 10,000 μS/cm.
    - Temperature: Pt1000
    - No Flow Interlock: Isolated dry contact closure (reed switch)
    - Water meter contactor: Isolated dry contact closure (reed switch).

4. Outputs:
    a. Control (on/off): Two internally powered relays, (WBL400 models) or Six internally powered relays (WBL410 models)
        - 6 A (resistive), 1/8 HP
        - All relays are fused together as one group, total current for this group cannot exceed 6A
        - 4 – 20 mA (optional): Fully isolated, internally powered, 600 ohm maximum resistive load.

5. Software features:
        - Control relays shall feature adjustable control direction and dead band.
        - Intermittent sampling shall be selectable.
        - If intermittent sampling has been selected, then a control strategy that detects and compensates for flashing shall be implemented.
        - Chemical feed shall be selectable from blowdown and feed, feed as a percentage of blowdown, feed as a percentage of time, feed based on a water meter contactor input and feed based on a paddlewheel water meter.
        - WBL410 models have up to 4 relays that may be configured as Feed relays. WBL400 models have one.
        - A self test shall be available to verify the integrity of the control module's sensor input circuitry.
        - Manual activation of the relays shall be easily accomplished via the keypad.
        - A maximum output on-time shall be available on both relays to prevent runaway control.
        - Software upgrade file shall be transferable to the controller via USB memory stick
        - Optional datalog of conductivity, temperature and water meter totals in 10 minute increments over a two-month period
        - Optional event log with time-stamped relay on/off and flow/no-flow events
        - Optional configuration file import/export feature

C. Sensor:

1. Operating Principle: The conductivity sensor shall be driven with a low voltage AC signal, and the return signal voltage will vary with the conductivity of the intervening solution.

   The Pt1000 temperature signal shall also be delivered to the control module, in order to automatically compensate for sensor errors due to temperature fluctuations.

2. Materials of construction: 316SS, PEEK or PVDF.
3. Process connections: 3/4" NPTM
4. Temperature range: 0 – 200 degrees C.
5. Pressure range: 0 – 250 psig.

D. Controller and Sensor Performance

1. Range: 0 – 10,000 μS/cm.
2. Accuracy: From 10-10,000 μS/cm ± 1% of reading; from 0-10 μS/cm ± 20% of reading.
3. Resolution: ± 1μS/cm.
4. Maximum separation between the controller and the sensor shall be 250 feet.

E. Indication

1. Graphic User Interface
    - A 2 line x 16 character backlit LCD display shall indicate the process value, a bar graph of the process value relative to set points, and the status of outputs and alarms.
    - LED lamps shall indicate the on/off status of the control outputs.

F. Equipment

The blowdown and feed boiler conductivity controller shall be a Walchem WBL400 series.

Part 3. Operator Functions

3.1 Calibration

A. The conductivity electrode calibration shall be a one point calibration, utilizing a solution of a known conductivity.

B. All set points shall be set through the 8 button keypad.

C. An access code shall be available to protect all set points and calibrations, while allowing the user to view any set point.

3.2 Control Module Function Details

A. The conductivity control output shall be on/off control with adjustable dead band.

B. The conductivity control direction shall be selected via the keypad.

C. The chemical feed output shall be on/off control with five choices of feed modes.

D. Both relays shall have limit timers to prevent runaway control.

Part 4. Execution

4.1 Installation

A. The sensor shall be installed in the skimmer line that draws a sample from 4-6 inches below the lowest possible boiler water level.

B. The sensor shall be installed in a pipe with no flow restrictions between the boiler water and the sensor.

C. The distance between the sensor and the boiler water shall be as short as possible.

D. The sample provided must be water, not steam. Back pressure must be provided by a flow control valve or orifice union located downstream from the sensor.

E. The sensor cable shall be routed such that it is separated from any AC voltage by at least 6 inches.

F. If the sensor cable needs to be extended beyond the standard 10 feet, then 24 AWG, 2 twisted pair, shielded cable shall be utilized, to a maximum of 250 ft.

G. If the optional 4 – 20 mA output is installed, then 22-26 AWG, twisted pair, shielded cable shall be utilized.

Part 5. Warranty

5.1 Terms

A. The manufacturer of the above specified equipment shall guarantee equipment of its manufacture, and bearing its identification to be free from defects in workmanship and material for a period of 24 months for electronics and 12 months for mechanical parts from date of delivery from the factory or authorized distributor under normal use and service and otherwise when such equipment is used in accordance with instructions furnished by the manufacturer and for the purposes disclosed in writing at the time of purchase, if any.

B. In the event a component fails to perform as specified and having been returned to the manufacturer transportation charges prepaid, and is proven defective in service during the warranty period, the manufacturer shall repair or replace the defective part. Replaceable elastomeric parts and glass components are expendable and are not covered by any warranty.

Part 6. Options

6.1 Related Equipment

A. Orifice Union for back pressure and blowdown rate control
B. Solenoid valve for blowdown control
C. EZB16D1-VC metering pump for chemical feed
D. Motorized ball valve for blowdown control
E. 100084 Sensor extension cable

Part 7. Spare Parts

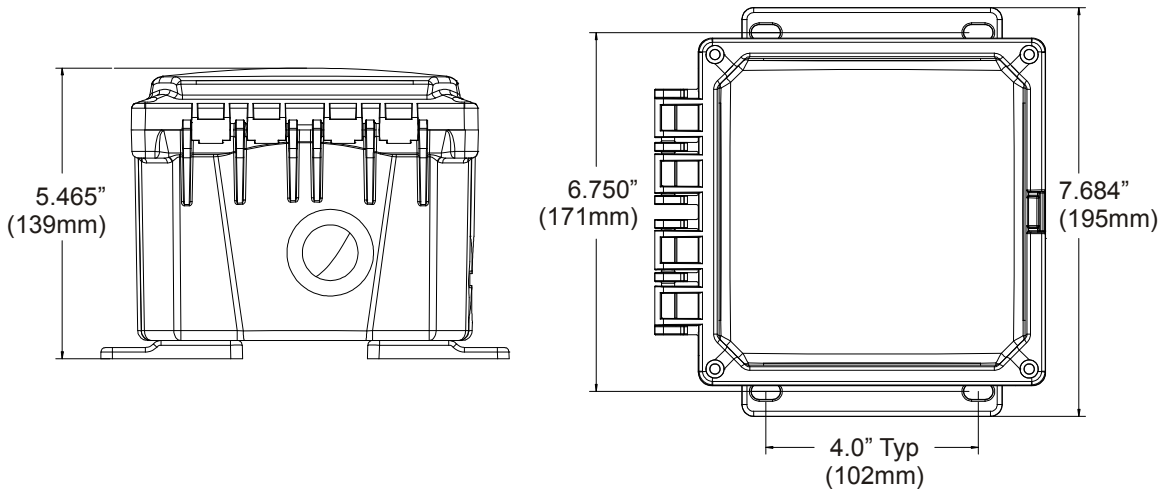
7.1 Recommended Spare Parts

A. 103163 Fuse, 1 A, 250 VAC
B. 102864 Fuse, 6 A, 250 VAC

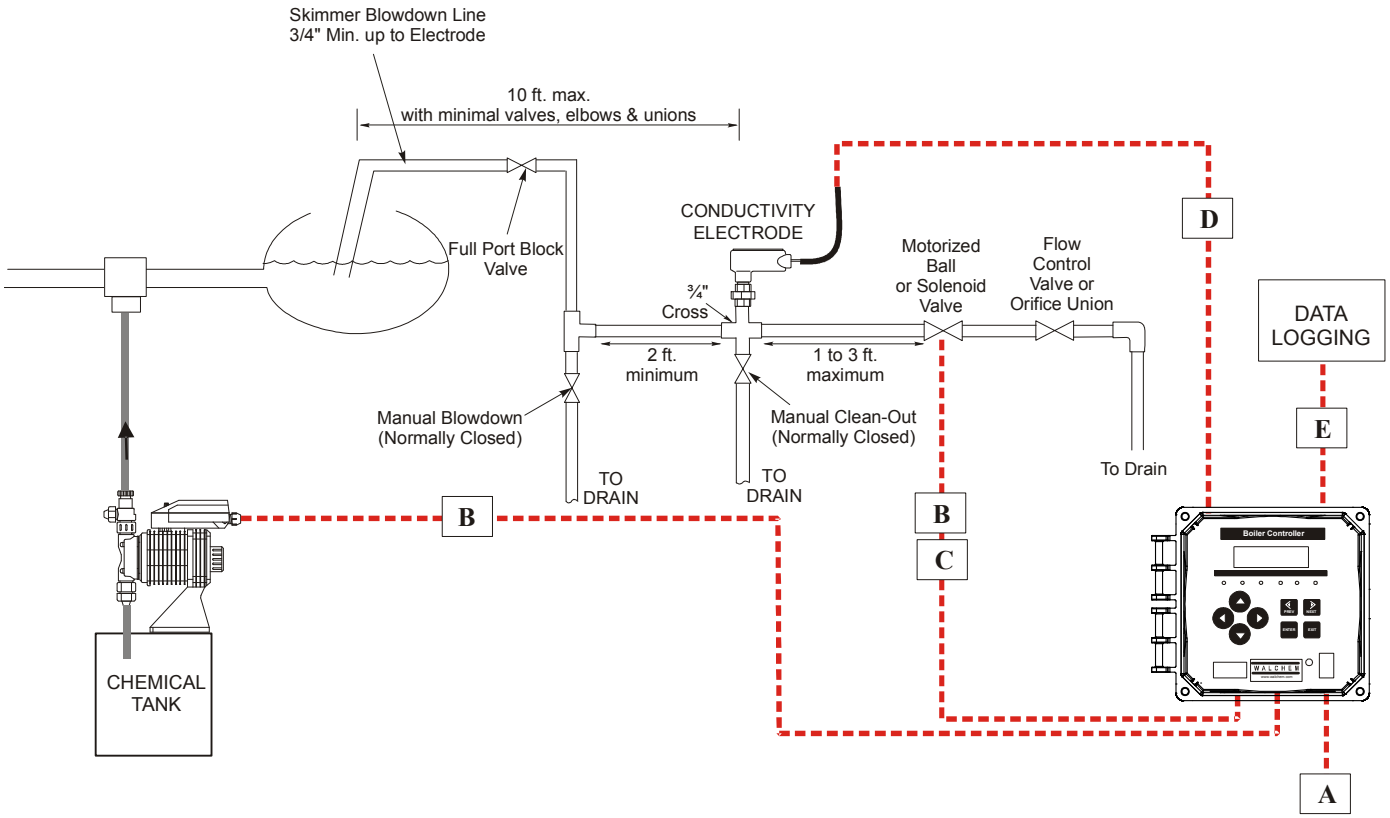
Specifications

Measurement Performance		**Mechanical**	
Conductivity		Enclosure	Polycarbonate
Range	0-10,000 µS/cm	NEMA rating	NEMA 4X
Resolution	1 µS/cm	Dimensions	See next page
Accuracy	10-10,000 µS/cm ±1% of reading	Display	2 x 16 character backlit liquid crystal
Temperature Range	32 to 392°F (0 to 200°C)	Ambient Temp	32 to 158°F (0 to 70°C)
Resolution	.01 degree	Storage Temp.	-20 to 180°F(-29 to 80°C)
Accuracy	±1% of reading	Shipping Weight	10 lbs (approximately)
Inputs		**Outputs**	
Power	100-240 VAC, 50/60 Hz, 8A Fuse: 1.0 ampere, 5 x 20 mm	Mechanical Relays	WBL400: 2 powered relays WBL410: 6 powered relays 6A resistive, 1/8 HP All relays are fused together as one group, total current for this group must not exceed 6A
Signal	(Optional-WBL only) Flow Meter: isolated, dry contact closure required (relay, reed switch)	4-20 mA(optional)	Fully isolated, internally powered,600Ω maximum resistive load. Resolution, .001% of span, accuracy ±1% of reading

Dimensions

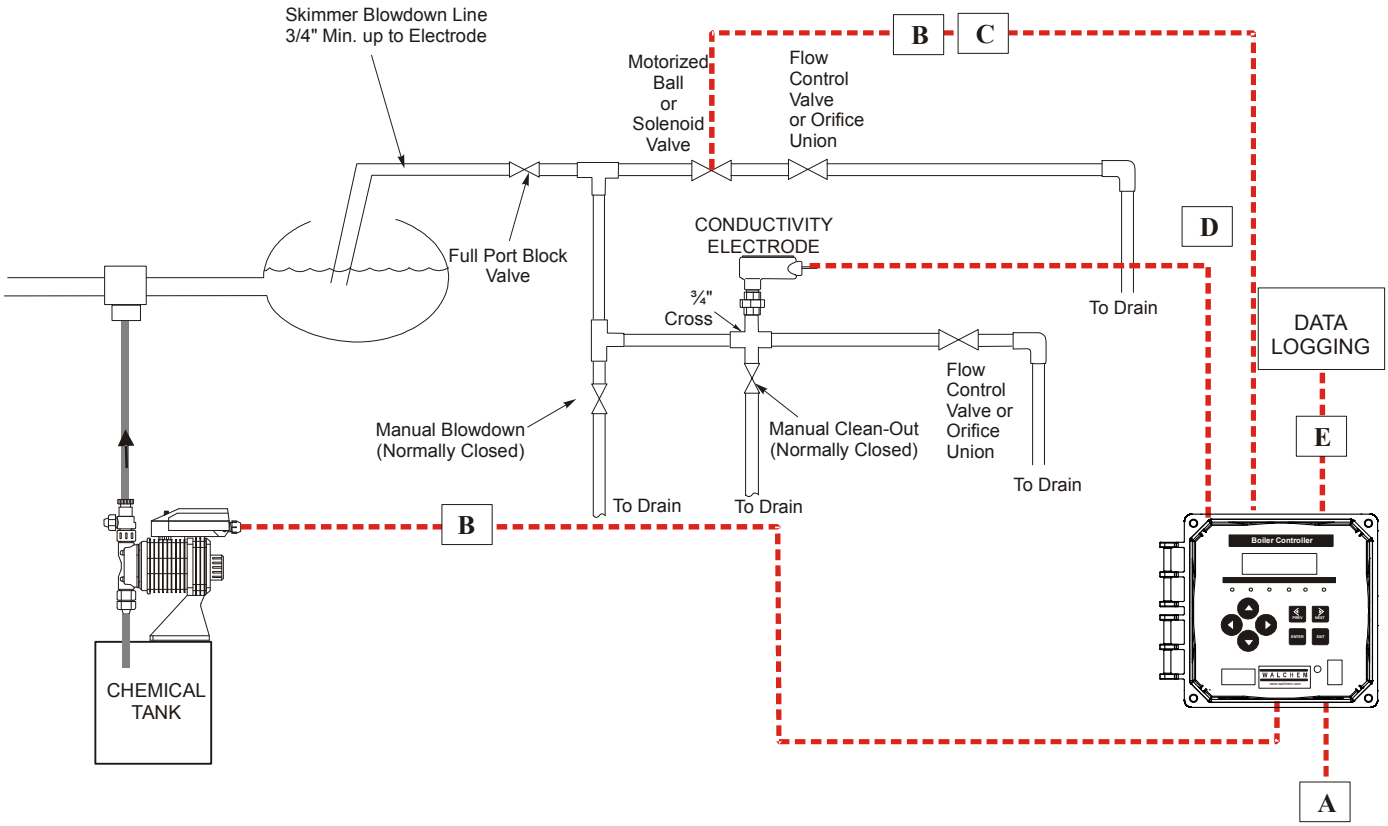


Typical Installation Intermittent Sampling



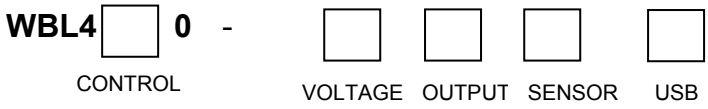
A	AC Power, 8 Amps Maximum, 2 x 18 AWG plus ground or local code
B	AC Power, 6 Amps Maximum, solenoid or metering pump, 2 x 18 AWG plus ground or local code
C	AC Power, 6 Amps Maximum, motorized ball valve, 3 x 18 AWG plus ground or local code
D	Conductivity Electrode, 4 x 24 AWG & shield, 10 feet supplied
E	Optional 4-20 mA output, 2 x 24 AWG & shield

Typical Installation Continuous Sampling



A	AC Power, 8 Amps Maximum, 2 x 18 AWG plus ground or local code
B	AC Power, 6 Amps Maximum, solenoid or metering pump, 2 x 18 AWG plus ground or local code
C	AC Power, 6 Amps Maximum, motorized ball valve, 3 x 18 AWG plus ground or local code
D	Conductivity Electrode, 4 x 24 AWG & shield, 10 feet supplied
E	Optional 4-20 mA output, 2 x 24 AWG & shield

WBL Series Ordering Information



CONTROL
0 = Two (2) powered relays
1 = Six (6) powered relays

VOLTAGE
1 = 120 VAC, prewired
5 = 100-240 VAC, conduit

OUTPUT
N = No data output
4 = Isolated 4-20 mA output

SENSOR
N = No electrode
5 = Standard electrode (up to 250 psi)

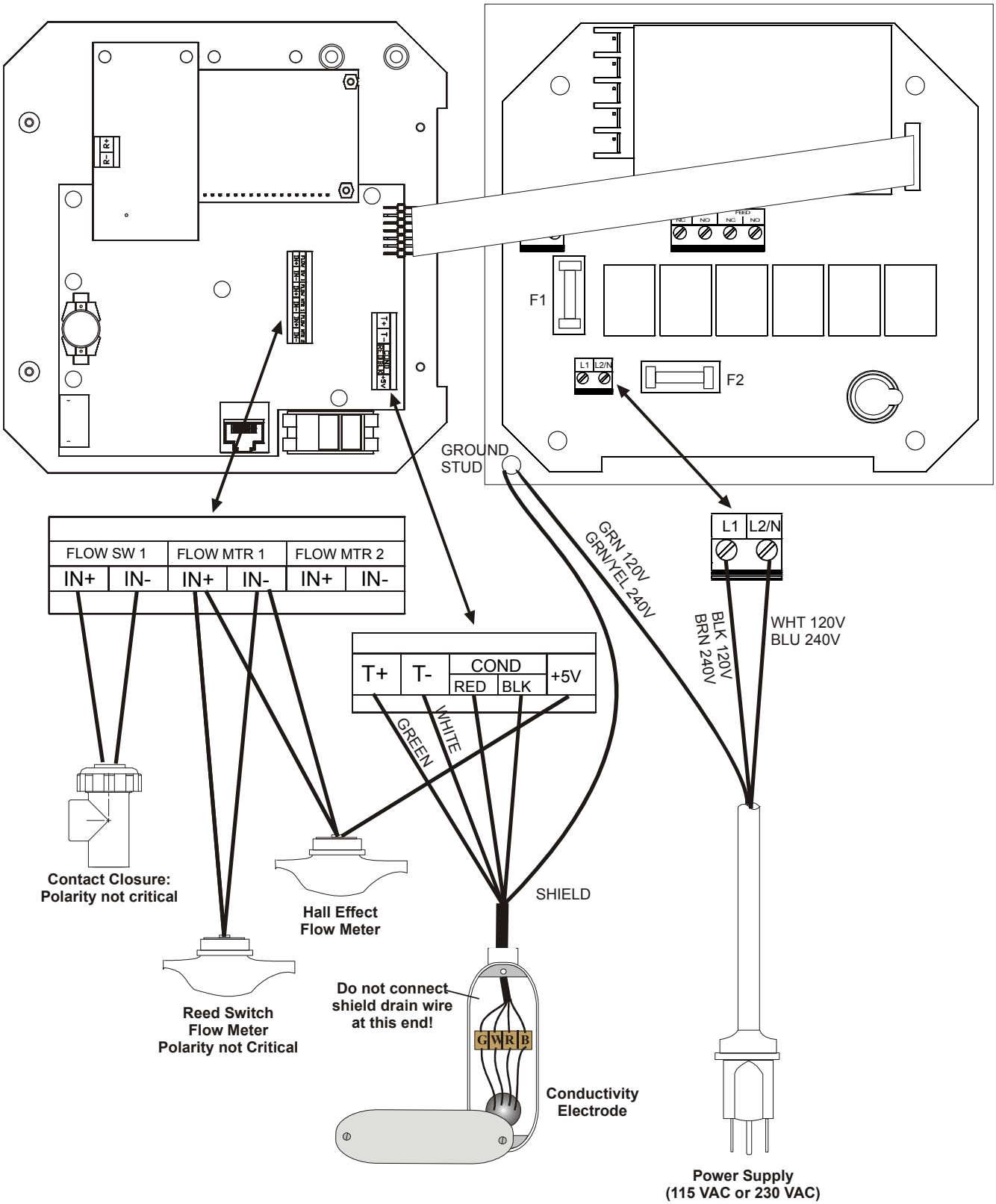
USB FEATURES
N = Software upgrade capability only
U = Integrated datalogging, event/reset logging, and configuration file import/export

Agency Approvals

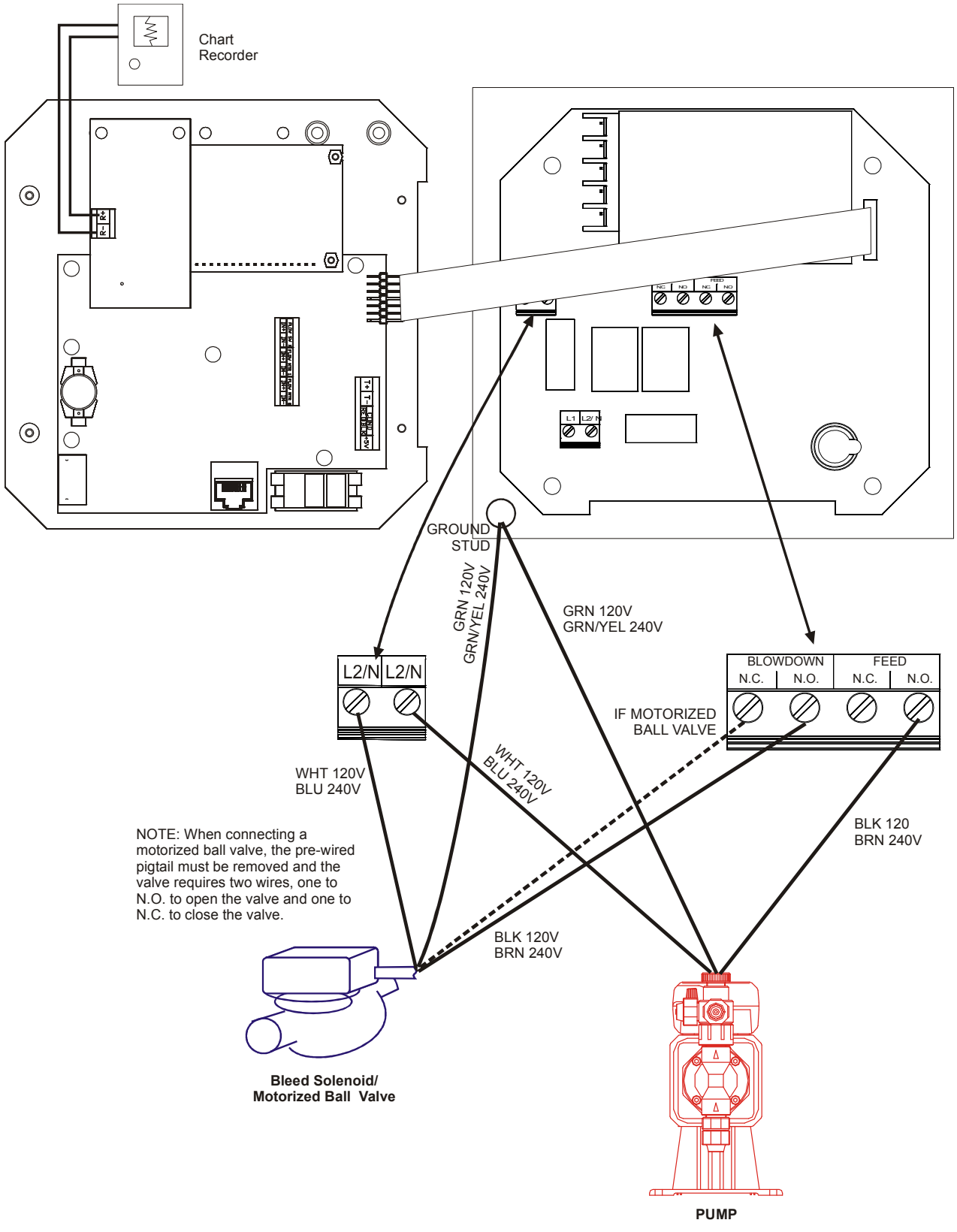
UL	ANSI/UL 61010-1:2004, 2nd Edition*
CAN/CSA	C22,2 No.61010-1:2004 2nd Edition*
CE Safety	EN 61010-1 2nd Edition (2001)*
CE EMC	EN 61326 :1998 Annex A*

Note: For EN61000-4-6,-3 the controller met performance criteria B.

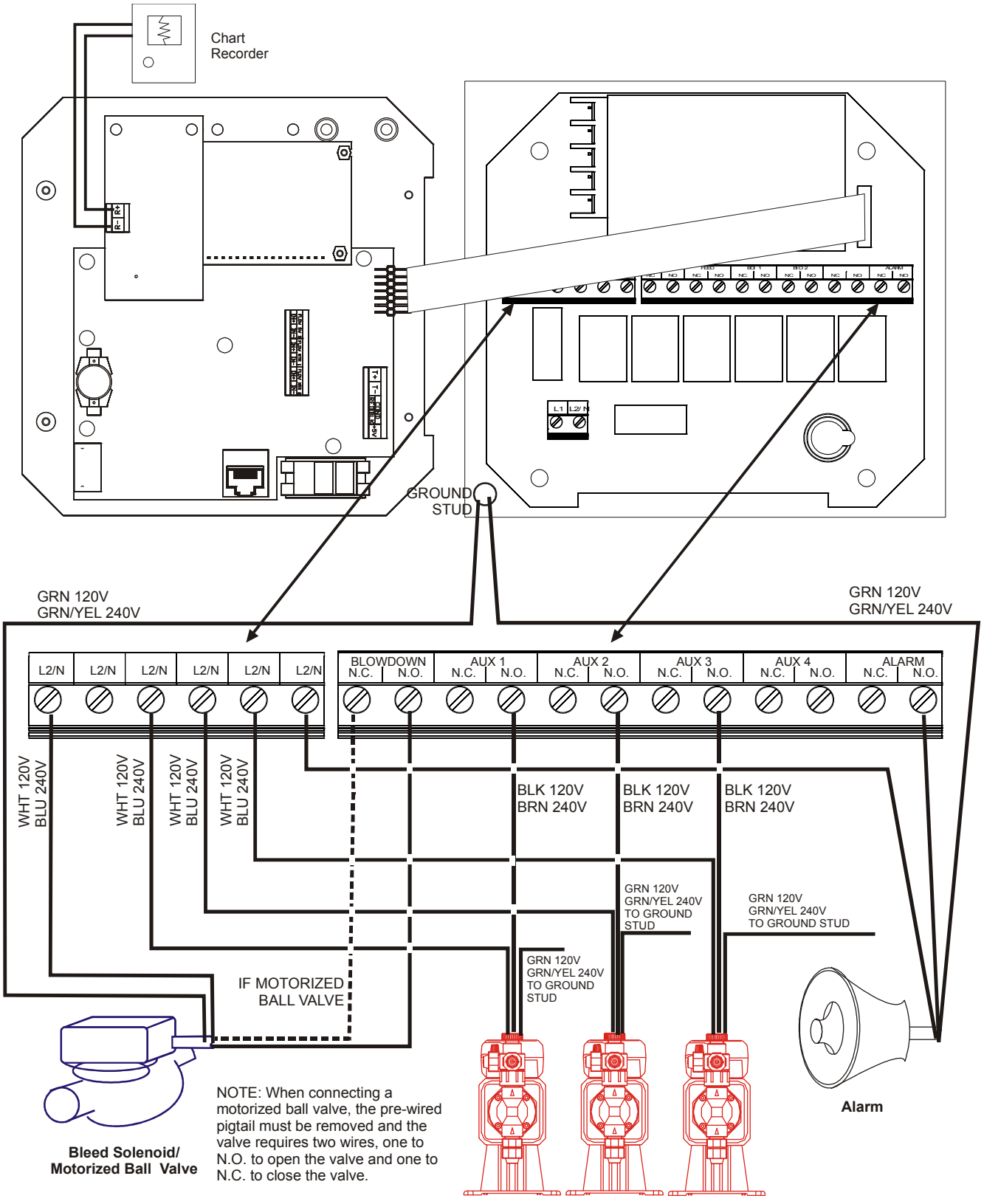
*Class A equipment: Equipment suitable for use in establishments other than domestic, and those directly connected to a low voltage (100-240 VAC) power supply network which supplies buildings used for domestic purposes.


F1
F2
L1
L2/N
GROUND
STUD
FLOW SW 1
FLOW MTR 1
FLOW MTR 2
IN+
IN-
IN+
IN-
IN+
IN-
T+
T-
COND
RED
BLK
+5V
GREEN
WHITE
SHIELD
GRN 120V
GRN/YEL 240V
BLK 120V
BRN 240V
WHT 120V
BLU 240V
Contact Closure:
Polarity not critical
Hall Effect
Flow Meter
Reed Switch
Flow Meter
Polarity not Critical
Do not connect
shield drain wire
at this end!
G W R B
Conductivity
Electrode
Power Supply
(115 VAC or 230 VAC)

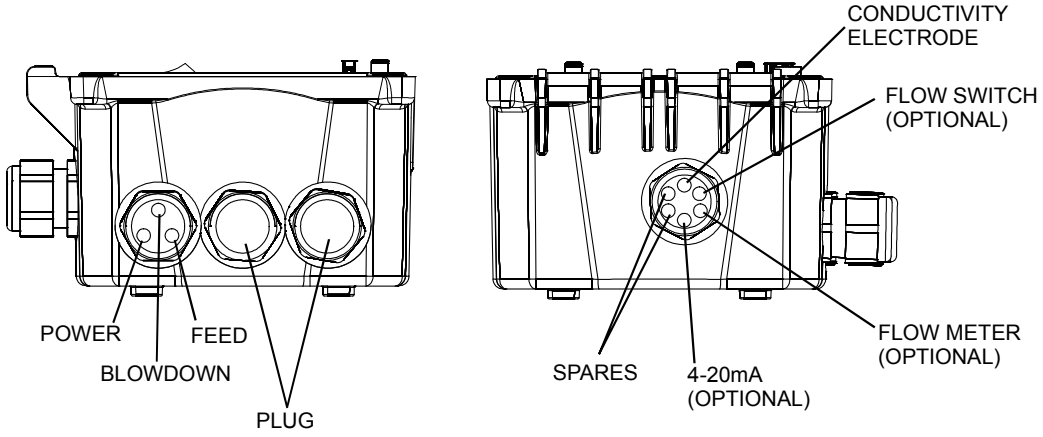
WBL INPUTS



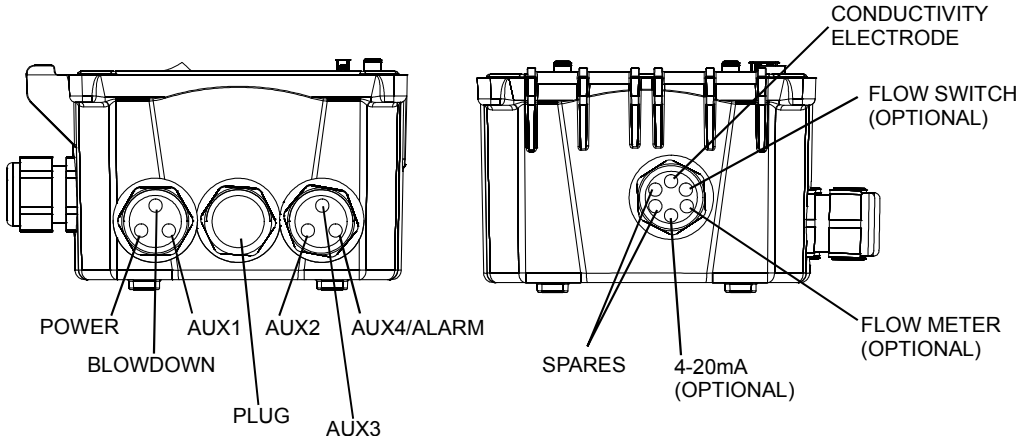
WBL 400 OUTPUTS



WBL 410 OUTPUTS



WBL400 Conduit Wiring



WBL410 Conduit Wiring